

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1.(Currently Amended) A display device comprising:

a plurality of pixels disposed in matrix over a substrate;

an active matrix circuit comprising a plurality of pixel TFTs over said substrate; and

a source driver and a gate driver which drive said active matrix circuit,

wherein n bit information out of m bit digital video data inputted from an external is used for a voltage gray scale method, and (m-n) bit information is used for a time ratio gray scale method, where said m and said n are integers equal to or larger than 2 and satisfy $m > n$, and

~~wherein a gray scale display level of one frame period of one pixel among said plurality of pixels corresponds to a value obtained by averaging gray scale voltage levels inputted in each subframe period contained in said one frame period~~

wherein each step of a voltage level for said voltage gray scale method is designated as $(V_H - V_L)/2^n$, where V_H is the highest voltage level of voltages inputted to a D/A converter circuit, and V_L is the lowest voltage level of voltages inputted to said D/A converter circuit.

2.(Currently Amended) A display device comprising:

a plurality of pixels disposed in matrix over a substrate;

an active matrix circuit comprising a plurality of pixel TFTs over said substrate; and

a source driver and a gate driver which drive said active matrix circuit,

wherein n bit information out of m bit digital video data inputted from an external is used for a voltage gray scale method, and (m-n) bit information is used for a time ratio gray scale method, where said m and said n are integers equal to or larger than 2 and satisfy $m > n$,

~~wherein a gray scale display level of one frame period of one pixel among said plurality of pixels corresponds to a value obtained by averaging gray scale voltage levels inputted in each subframe period contained in said one frame period, and~~

wherein each step of a voltage level for said voltage gray scale method is designated as $(V_H - V_L)/2^n$, where V_H is the highest voltage level of voltages inputted to a D/A converter circuit, and V_L is the lowest voltage level of voltages inputted to said D/A converter circuit, and

wherein said one frame period comprises 2^{m-n} subframe periods.

3.(Currently Amended) A display device comprising:

a plurality of pixels disposed in matrix over a substrate;

an active matrix circuit comprising a plurality of pixel TFTs over said substrate;

a source driver and a gate driver which drive said active matrix circuit over said substrate; and

a circuit which converts m bit digital video data inputted from an external into n bit digital video data and provides said n bit digital video data to said source driver, where said m and said n are integers equal to or larger than 2 and satisfy $m > n$, wherein said circuit is formed over said substrate,

~~wherein a gray scale display level of one frame period of one pixel among said plurality of pixels corresponds to a value obtained by averaging gray scale voltage levels inputted in each subframe period contained in said one frame period, and~~

wherein each step of a voltage level for said voltage gray scale method is designated as $(V_H - V_L)/2^n$, where V_H is the highest voltage level of voltages inputted to a D/A converter circuit, and V_L is the lowest voltage level of voltages inputted to said D/A converter circuit, and

wherein one frame image comprises 2^{m-n} subframes.

4.(Currently Amended) A display device comprising:

a plurality of pixels disposed in matrix over a substrate;

an active matrix circuit comprising a plurality of pixel TFTs over said substrate;

a source driver and a gate driver which drive said active matrix circuit over said substrate; and

a circuit which converts m bit digital video data inputted from an external into n bit digital video data and provides said n bit digital video data to said source driver, where said m and said n are integers equal to or larger than 2 and satisfy $m > n$, wherein said circuit is formed over said substrate,

~~wherein a gray scale display level of one frame period of one pixel among said plurality of pixels corresponds to a value obtained by averaging gray scale voltage levels inputted in each subframe period contained in said one frame period, and~~

wherein each step of a voltage level for said voltage gray scale method is designated as $(VH-VL)/2^n$, where VH is the highest voltage level of voltages inputted to a D/A converter circuit, and VL is the lowest voltage level of voltages inputted to said D/A converter circuit, and

wherein one frame image comprises 2^{m-n} subframes.

5.(Currently Amended) A display device comprising:

a plurality of pixels disposed in matrix over a substrate;

an active matrix circuit comprising a plurality of pixel TFTs over said substrate; and

a source driver and a gate driver which drive said active matrix circuit,

wherein n bit information out of m bit digital video data inputted from an external is used for a voltage gray scale method and (m-n) bit information is used for a time ratio gray scale method, where said m and said n are integers equal to or larger than 2 and satisfy $m > n$,

~~wherein a gray scale display level of one frame period of one pixel among said~~

~~plurality of pixels corresponds to a value obtained by averaging gray scale voltage levels inputted in each subframe period contained in said one frame period, and~~

wherein each step of a voltage level for said voltage gray scale method is designated as $(VH-VL)/2^n$, where VH is the highest voltage level of voltages inputted to a D/A converter circuit, and VL is the lowest voltage level of voltages inputted to said D/A converter circuit, and
wherein an image is displayed by an image gray scale of $(2^m-(2^{m-n}-1))$ patterns.

6.(Currently Amended) A display device comprising:

a plurality of pixels disposed in matrix over a substrate;

an active matrix circuit comprising a plurality of pixel TFTs over said substrate; and

a source driver and a gate driver which drive said active matrix circuit,

wherein n bit information out of m bit digital video data inputted from an external is used for a voltage gray scale method and (m-n) bit information is used for a time ratio gray scale method, where said m and said n are integers equal to or larger than 2 and satisfy $m > n$,

~~wherein a gray scale display level of one frame period of one pixel among said plurality of pixels corresponds to a value obtained by averaging gray scale voltage levels inputted in each subframe period contained in said one frame period,~~

wherein each step of a voltage level for said voltage gray scale method is designated as $(VH-VL)/2^n$, where VH is the highest voltage level of voltages inputted to a D/A converter circuit, and VL is the lowest voltage level of voltages inputted to said D/A converter circuit, and

wherein said one frame period comprises 2^{m-n} subframe periods, and

wherein an image is displayed by an image gray scale of $(2^m-(2^{m-n}-1))$ patterns.

7.(Currently Amended) A display device comprising:

a plurality of pixels disposed in matrix over a substrate;

an active matrix circuit comprising a plurality of pixel TFTs over said substrate;

a source driver and a gate driver which drive said active matrix circuit over said substrate; and

a circuit which converts m bit digital video data inputted from an external into n bit digital video data and provides said n bit digital video data to said source driver, wherein said m and said n are integers equal to or larger than 2 and satisfy $m > n$, wherein said circuit is formed over said substrate,

~~wherein a gray scale display level of one frame period of one pixel among said plurality of pixels corresponds to a value obtained by averaging gray scale voltage levels inputted in each subframe period contained in said one frame period, and~~

wherein each step of a voltage level for said voltage gray scale method is designated as $(V_H - V_L)/2^n$, where V_H is the highest voltage level of voltages inputted to a D/A converter circuit, and V_L is the lowest voltage level of voltages inputted to said D/A converter circuit, and

wherein an image is displayed by an image gray scale of $(2^m - (2^{m-n} - 1))$ patterns.

8.(Currently Amended) A display device comprising:

a plurality of pixels disposed in matrix over a substrate;

an active matrix circuit comprising a plurality of pixel TFTs over said substrate;

a source driver and a gate driver which drive said active matrix circuit over said substrate; and

a circuit which converts m bit digital video data inputted from an external into n bit digital video data and provides said n bit digital video data to said source driver, wherein said m and said n are integers equal to or larger than 2 and satisfy $m > n$, wherein said circuit is formed over said substrate,

~~wherein a gray scale display level of one frame period of one pixel among said~~

~~plurality of pixels corresponds to a value obtained by averaging gray scale voltage levels inputted in each subframe period contained in said one frame period,~~

wherein each step of a voltage level for said voltage gray scale method is designated as $(VH-VL)/2^n$, where VH is the highest voltage level of voltages inputted to a D/A converter circuit, and VL is the lowest voltage level of voltages inputted to said D/A converter circuit, and

wherein one frame image comprises 2^{m-n} subframes, and

wherein an image is displayed by an image gray scale of $(2^m-(2^{m-n}-1))$ patterns.

9.(Previously Presented) A display device according to claim 1 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

10.(Previously Presented) A display device according to claim 1 wherein said m is 8 and said n is 2.

11.(Previously Presented) A display device according to claim 1 wherein said m is 12 and said n is 4.

12.(Previously Presented) A rear projector comprising three of the display devices according to claim 1.

13.(Previously Presented) A front projector comprising three of the display devices according to claim 1.

14.(Previously Presented) A single plate type rear projector comprising a display

device according to claim 1.

15.(Previously Presented) A goggle type display comprising two of the display device according to claim 1.

16.(Previously Presented) A portable information terminal comprising a display device according to claim 1.

17.(Previously Presented) A notebook type personal computer comprising a display device according to claim 1.

18.(Previously Presented) An EL display comprising a display device according to claim 1.

19.(Previously Presented) A display device according to claim 2 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

20.(Previously Presented) A display device according to claim 3 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

21.(Previously Presented) A display device according to claim 4 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

22.(Previously Presented) A display device according to claim 5 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

23.(Previously Presented) A display device according to claim 6 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

24.(Previously Presented) A display device according to claim 7 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

25.(Previously Presented) A display device according to claim 8 wherein said display device comprises thresholdless antiferroelectric mixed liquid crystal indicating electro-optical characteristic of V-shape.

26.(Previously Presented) A display device according to claim 2 wherein said m is 8 and said n is 2.

27.(Previously Presented) A display device according to claim 3 wherein said m is 8 and said n is 2.

28.(Previously Presented) A display device according to claim 4 wherein said m is 8 and said n is 2.

29.(Previously Presented) A display device according to claim 5 wherein said m is 8 and said n is 2.

30.(Previously Presented) A display device according to claim 6 wherein said m is 8 and said n is 2.

31.(Previously Presented) A display device according to claim 7 wherein said m is 8 and said n is 2.

32.(Previously Presented) A display device according to claim 8 wherein said m is 8 and said n is 2.

33.(Previously Presented) A display device according to claim 2 wherein said m is 12 and said n is 4.

34.(Previously Presented) A display device according to claim 3 wherein said m is 12 and said n is 4.

35.(Previously Presented) A display device according to claim 4 wherein said m is 12 and said n is 4.

36.(Previously Presented) A display device according to claim 5 wherein said m is 12 and said n is 4.

37.(Previously Presented) A display device according to claim 6 wherein said m is 12 and said n is 4.

38.(Previously Presented) A display device according to claim 7 wherein said m is 12 and said n is 4.

39.(Previously Presented) A display device according to claim 8 wherein said m is 12 and said n is 4.

40.(Previously Presented) A rear projector comprising three of the display devices according to claim 2.

41.(Previously Presented) A rear projector comprising three of the display devices according to claim 3.

42.(Previously Presented) A rear projector comprising three of the display devices according to claim 4.

43.(Previously Presented) A rear projector comprising three of the display devices according to claim 5.

44.(Previously Presented) A rear projector comprising three of the display devices according to claim 6.

45.(Previously Presented) A rear projector comprising three of the display devices

according to claim 7.

46.(Previously Presented) A rear projector comprising three of the display devices according to claim 8.

47.(Previously Presented) A front projector comprising three of the display devices according to claim 2.

48.(Previously Presented) A front projector comprising three of the display devices according to claim 3.

49.(Previously Presented) A front projector comprising three of the display devices according to claim 4.

50.(Previously Presented) A front projector comprising three of the display devices according to claim 5.

51.(Previously Presented) A front projector comprising three of the display devices according to claim 6.

52.(Previously Presented) A front projector comprising three of the display devices according to claim 7.

53.(Previously Presented) A front projector comprising three of the display devices according to claim 8.

54.(Previously Presented) A single plate type rear projector comprising a display device according to claim 2.

55.(Previously Presented) A single plate type rear projector comprising a display device according to claim 3.

56.(Previously Presented) A single plate type rear projector comprising a display device according to claim 4.

57.(Previously Presented) A single plate type rear projector comprising a display device according to claim 5.

58.(Previously Presented) A single plate type rear projector comprising a display device according to claim 6.

59.(Previously Presented) A single plate type rear projector comprising a display device according to claim 7.

60.(Previously Presented) A single plate type rear projector comprising a display device according to claim 8.

61.(Previously Presented) A goggle type display comprising two of the display device according to claim 2.

62.(Previously Presented) A goggle type display comprising two of the display device according to claim 3.

63.(Previously Presented) A goggle type display comprising two of the display device according to claim 4.

64.(Previously Presented) A goggle type display comprising two of the display device according to claim 5.

65.(Previously Presented) A goggle type display comprising two of the display device according to claim 6.

66.(Previously Presented) A goggle type display comprising two of the display device according to claim 7.

67.(Previously Presented) A goggle type display comprising two of the display device according to claim 8.

68.(Previously Presented) A portable information terminal comprising a display device according to claim 2.

69.(Previously Presented) A portable information terminal comprising a display device according to claim 3.

70.(Previously Presented) A portable information terminal comprising a display

device according to claim 4.

71.(Previously Presented) A portable information terminal comprising a display device according to claim 5.

72.(Previously Presented) A portable information terminal comprising a display device according to claim 6.

73.(Previously Presented) A portable information terminal comprising a display device according to claim 7.

74.(Previously Presented) A portable information terminal comprising a display device according to claim 8.

75.(Canceled)

76.(Previously Presented) A notebook type personal computer comprising a display device according to claim 2.

77.(Previously Presented) A notebook type personal computer comprising a display device according to claim 3.

78.(Previously Presented) A notebook type personal computer comprising a display device according to claim 4.

79.(Previously Presented) A notebook type personal computer comprising a display device according to claim 5.

80.(Previously Presented) A notebook type personal computer comprising a display device according to claim 6.

81.(Previously Presented) A notebook type personal computer comprising a display device according to claim 7.

82.(Previously Presented) A notebook type personal computer comprising a display device according to claim 8.

83.(Previously Presented) An EL display comprising a display according to claim 2.

84.(Previously Presented) An EL display comprising a display device according to claim 3.

83.(Canceled)

85.(Previously Presented) An EL display comprising a display device according to claim 5.

86.(Previously Presented) An EL display comprising a display device according to claim 6.

87.(Previously Presented) An EL display comprising a display device according to claim 7.

88.(Previously Presented) An EL display comprising a display device according to claim 8.

89.(Previously Presented) A mobile telephone comprising a display device according to claim 1.

90.(Previously Presented) A mobile telephone comprising a display device according to claim 2.

91.(Previously Presented) A mobile telephone comprising a display device according to claim 3.

92.(Previously Presented) A mobile telephone comprising a display device according to claim 4.

93.(Previously Presented) A mobile telephone comprising a display device according to claim 5.

94.(Previously Presented) A mobile telephone comprising a display device according to claim 6.

95.(Previously Presented) A mobile telephone comprising a display device according

to claim 7.

96.(Previously Presented) A mobile telephone comprising a display device according to claim 8.

97.(Previously Presented) A video camera comprising a display device according to claim 1.

98.(Previously Presented) A video camera comprising a display device according to claim 2.

99.(Previously Presented) A video camera comprising a display device according to claim 3.

100.(Previously Presented) A video camera comprising a display device according to claim 4.

101.(Previously Presented) A video camera comprising a display device according to claim 5.

102.(Previously Presented) A video camera comprising a display device according to claim 6.

103.(Previously Presented) A video camera comprising a display device according to claim 7.

104.(Previously Presented) A video camera comprising a display device according to claim 8.

105.(Previously Presented) A mobile computer comprising a display device according to claim 1.

106.(Previously Presented) A mobile computer comprising a display device according to claim 2.

107.(Previously Presented) A mobile computer comprising a display device according to claim 3.

108.(Previously Presented) A mobile computer comprising a display device according to claim 4.

109.(Previously Presented) A mobile computer comprising a display device according to claim 5.

110.(Previously Presented) A mobile computer comprising a display device according to claim 6.

111.(Previously Presented) A mobile computer comprising a display device according to claim 7.

112.(Previously Presented) A mobile computer comprising a display device according to claim 8.

113.(Previously Presented) A portable electronic book comprising a display device according to claim 1.

114.(Previously Presented) A portable electronic book comprising a display device according to claim 2.

115.(Previously Presented) A portable electronic book comprising a display device according to claim 3.

116.(Previously Presented) A portable electronic book comprising a display device according to claim 4.

117.(Previously Presented) A portable electronic book comprising a display device according to claim 5.

118.(Previously Presented) A portable electronic book comprising a display device according to claim 6.

119.(Previously Presented) A portable electronic book comprising a display device according to claim 7.

120.(Previously Presented) A portable electronic book comprising a display device

according to claim 8.

121.(Previously Presented) A personal computer comprising a display device according to claim 1.

122.(Previously Presented) A personal computer comprising a display device according to claim 2.

123.(Previously Presented) A personal computer comprising a display device according to claim 3.

124.(Previously Presented) A personal computer comprising a display device according to claim 4.

125.(Previously Presented) A personal computer comprising a display device according to claim 5.

126.(Previously Presented) A personal computer comprising a display device according to claim 6.

127.(Previously Presented) A personal computer comprising a display device according to claim 7.

128.(Previously Presented) A personal computer comprising a display device according to claim 8.

129.(Previously Presented) An electronic game equipment comprising a display device according to claim 1.

130.(Previously Presented) An electronic game equipment comprising a display device according to claim 2.

131.(Previously Presented) An electronic game equipment comprising a display device according to claim 3.

132.(Previously Presented) An electronic game equipment comprising a display device according to claim 4.

133.(Previously Presented) An electronic game equipment comprising a display device according to claim 5.

134.(Previously Presented) An electronic game equipment comprising a display device according to claim 6.

135.(Previously Presented) An electronic game equipment comprising a display device according to claim 7.

136.(Previously Presented) An electronic game equipment comprising a display device according to claim 8.

137.(Previously Presented) An image reproduction device comprising a display device according to claim 1.

138.(Previously Presented) An image reproduction device comprising a display device according to claim 2.

139.(Previously Presented) An image reproduction device comprising a display device according to claim 3.

140.(Previously Presented) An image reproduction device comprising a display device according to claim 4.

141.(Previously Presented) An image reproduction device comprising a display device according to claim 5.

142.(Previously Presented) An image reproduction device comprising a display device according to claim 6.

143.(Previously Presented) An image reproduction device comprising a display device according to claim 7.

144.(Previously Presented) An image reproduction device comprising a display device according to claim 8.

145.(Previously Presented) A digital camera comprising a display device according

to claim 1.

146.(Previously Presented) A digital camera comprising a display device according to claim 2.

147.(Previously Presented) A digital camera comprising a display device according to claim 3.

148.(Previously Presented) A digital camera comprising a display device according to claim 4.

149.(Previously Presented) A digital camera comprising a display device according to claim 5.

150.(Previously Presented) A digital camera comprising a display device according to claim 6.

151.(Previously Presented) A digital camera comprising a display device according to claim 7.

152.(Previously Presented) A digital camera comprising a display device according to claim 8.

153.(Previously Presented) An EL display comprising a display device according to claim 4.